REMARKS

Claims 8-11, 13-17 and 19 are pending and have not been amended hereby. In the final Office Action mailed July 27, 2005, the Office addressed the claims as follows: claims 8-11, 13-17 and 19 are rejected pursuant to 35 USC 103(a) as being unpatentable over Rogers et al. (Patent No. 6,139,694) in view of Alix et al. (6,117,403) or Ruan et al. (6,565,716); claims 8-11, 13-17 and 19 are rejected under the judicially created doctrine of double patenting in view of claims 2, 3 and 5-7 of US Patent No. 6,309,610. In view of the remarks presented herein, the undersigned respectfully traverses this rejection as set forth below.

Rejection of Claims 8-11, 13-17 and 19 Under 35 USC 103(a)

As set forth in the submission with Request for Continued Examination, independent claim 8 includes the following:

> 8. An apparatus for converting nitric oxide in exhaust gas into nitrogen dioxide, comprising:
>
> a plasma reactor having a plurality of dielectrically-coated electrodes defining at least one reaction zone configured to receive the gas, said dielectrically-coated electrodes each having an electrode plate completely enclosed within a fluoropolymeric shell, the fluoropolymeric shell having a dielectric strength of 60 kV/mm; and
>
> a voltage supply connected to each of the dielectrically-coated electrodes to provide a voltage across the dielectrically-coated electrodes.

In the non-final Office Action, the Office admits that the primary reference, Rogers (6,139,694), does not teach or suggest that the electrode plate is completely enclosed within the claimed fluoropolymeric dielectric having the specified dielectric strength. The Office has argued that Alix et al. or Ruan et al. teach the complete enclosure of an electrode within a dielectric material and that Rogers lists Teflon and Teflon PFA as useable dielectric materials and thus the

combination of limitations recited in independent claim 8 would have been obvious to one skilled in the art.

The undersigned respectfully submits that the use of the fluoropolymeric shell having a dielectric strength of 60 kV/mm completely enclosing the electrodes as claimed in independent claim 8, in combination with the other limitations of claim 8, produced unexpected results. All of the references cited, i.e., Rogers, Alix and Ruan, generally disclose the use of a dielectric material, wherein a laundry list of available materials are deemed appropriate for use, e.g., glass, ceramic, quartz, Teflon, epoxy, etc. Rogers deemed any of these dielectric materials to be equally appropriate and did not describe complete enclosure of the electrodes. Referring to page 21, line 22 through page 22, line 8 and Figure 5 of the present application:

> The use of ethanol as a pre-injectant increases the efficiency of the non-thermal plasma apparatus by as much as a factor of ten. The combined use of ethanol injection and fluorocarbon dielectrics further increases efficiency. Referring to FIG. 5, the NO concentrations in gas streams containing molar ratios of ethanol to initial NO of 8:1 are compared for PYREX™ glass and TEFLON™ PFA dielectrics. When using the TEFLON™ PFA dielectrics, substantially 90% NO removal was obtained with only 48 Watts of plasma reactor power. The calculated molecular energy consumption for this data point was approximately 17 eV per NO representing a 30% decrease in energy consumption as compared to the stream treated with PYREX™ glass dielectrics.

This explicit description evidences the unexpected results, i.e., significant decrease in energy consumption, that results from the use of a fluoropolymeric shell having a dielectric strength of 60 kV/mm, i.e., TEFLON™ PFA, completing enclosing the electrode plate. (See Table 1 reproduced below). See MPEP 716.02(b)III. DIRECT AND INDIRECT COMPARATIVE TESTS ARE PROBATIVE OF NONOBVIOUSNESS (Evidence of unexpected properties may be in the form of a direct or indirect comparison of the claimed invention with the closest prior art which is commensurate in scope with the claims. See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

Material	Dielectric Constant	Dielectric Strength (kV/mm)	Tensile Strength (kpsi)	Working Temp. (C.)
PFA TEFLON ®	2.1	60	2.20	260
PYREX ® glass	4.5	13	0.14	450

These unexpected results were clearly not identified or contemplated by the art cited as these references merely describe the use of any of a laundry list of dielectric materials, equating glass with fluoropolymeric materials, for the purposes described. The Examiner has argued that,

> Since Rogers discloses in col. 4, lines 30-36 that Teflon and Teflon PFA may be particularly suited for use as a dielectric and are available from Toefco Engineering, Inc., Niles, Michigan, Rogers contemplates the use of Teflon fluorocarbon as the preferred embodiment (emphasis added).

The undersigned submits that this paragraph does not contemplate the significant unexpected reduction in power consumption which results from the combination of limitations set forth in claim 8. Merely pointing out that certain materials, only one of which has the dielectric strength recited in the claim, **may** be used as a dielectric, does not foretell of the unexpected reduction in power consumption that results from the use of a material having an exact dielectric strength in the manner set forth in the claims, e.g., completely enclosing the electrode plate. As admitted by the Office, Rogers does not describe completely enclosing the electrode plate in the dielectric. Further, Rogers does not mention the dielectric strength of any materials or the importance thereof. Whereas the current specification identifies dielectric strength as a key property which contributes to the unexpected reduction in power consumption stating,

> While the dielectric constant of PFA TEFLON™. is comparable to that of PYREX™ glass, the dielectric strength is much higher. In view of this observation, the thickness of a PFA TEFLON™ coating can be less than that used for PYREX™, leaving more volume for the gas stream. The desirable working temperature of PFA TEFLON™ is lower than that for PYREX™, however, it remains sufficient for treating most types of contaminated gas. As previously noted, the PFA TEFLON™ provides relatively high tensile strength, rendering the electrodes ductile and less susceptible to breakage, thus improving the efficiency and durability of the apparatus.

The undersigned submits that the claimed combination is not obvious in view of the cited references since the claimed combination produced an unexpected result of reduced power consumption.

Rejection of Claims 8-11, 13-17 and 19 Under Obviousness-type Double Patenting in View of Patent No. 6,309,610

The undersigned traverses this rejection for the reasons set forth in the previous response, but will consider filing a terminal disclaimer to overcome this rejection once other rejections over have been overcome.

CONCLUSION

The undersigned believes that claims 8-11, 13-17 and 19 are allowable over the cited prior art and respectfully requests a notice of allowance to this effect. Should the Examiner determine that any further action is necessary to place this application into better form, the Examiner is encouraged to telephone the undersigned representative at the number listed below. In addition, if any additional fees are required in connection with the filing of this response, the Commissioner is hereby authorized to charge the same to Deposit Account No. 501458.

Respectfully submitted,

Date: 9/26/05 By: */Dawn-Marie Bey Reg. No.44,442/*
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